

Digital Engineering Terms and Definitions

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Introduction

This glossary contains terms and definitions used in the Digital Engineering (DE) suite of documents.

The terms listed in this glossary align with the terms and definitions provided in the [TfNSW Asset Management Branch \(AMB\) Glossary](#) (accessible to Transport for NSW staff only).

Terms and definitions

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Term	Definition	Reference
Number		
2D	2-dimensional representation of an object or asset with associated geometrical information attached to it in a traditional drawing-based format, often referred as a CAD drawing.	-
3D BIM	3-dimensional representation of an element or asset representing its geometrical (graphical) and non-geometrical (non-graphical) information. Referred to generally in the Digital Engineering (DE) Framework as the BIM model.	-
4D BIM	4-dimensional – links time (schedule) related data to a BIM model.	-
5D BIM	5-dimensional – links cost related data to a BIM model.	-
6D BIM	6-dimensional – links asset information to a BIM model.	-
A		
archive	Component of the common data environment (CDE) used to hold a journal of all information containers that have been shared and published during the information management process as well as an audit trail of their development.	AS ISO 19650.1:2019

Term	Definition	Reference
AR/VR Augmented Reality / Virtual Reality	Computer-generated simulation of a three-dimensional image or environment that can be interacted with a seemingly real or physical way by a person using special electronic equipment, such as a helmet with a screen inside or gloves fitted with sensors.	DMS-SD-130
ASA	Former name for Asset Management Branch (AMB).	TfNSW
As-Built / Works As Executed	Drawings that reflect the final work as executed and not the changes that have occurred during the design stages.	TfNSW
asset	Item, object or entity that has potential or actual value to an organisation.	ISO 55000:2014
asset classification	A standardised method of identifying and grouping assets. Asset classification is comprised of asset type or element, based on the Uniclass Elements/ Functions (EF) and Products (Pr) tables, and asset system, based on the Uniclass Systems (Ss) table.	-
asset custodian	The party (typically a customer division) with end-to-end accountability for a portfolio of assets.	TfNSW
asset information	Data or information relating to the specification, design, construction or acquisition, operation and maintenance and disposal or decommissioning of an asset.	TfNSW
asset information model (AIM)	Data and information that relates to assets to a level required to support an organisation's asset management system. Often initiated from the Project Information Model on asset handover.	AS ISO 19650.1:2019
asset information requirements (AIR)	Data and information requirements of the organisation in relation to the asset(s) it is responsible for.	AS ISO 19650.1:2019
asset life cycle	An asset's life cycle is its evolution from need identification through to disposal and decommissioning.	-
asset management	Coordinated set of intelligent activities for an organisation to realise value from their assets.	ISO 55000:2014
Asset Management Branch (AMB)	Asset Management Branch is an independent unit within Transport for NSW (TfNSW) and is the network design and standards authority for defined NSW transport assets. Formerly the Asset Standards Authority (ASA).	TfNSW

Term	Definition	Reference
Asset Management Branch (AMB) requirements	The standards, plans, processes, procedures, instructions, requirements and guidance material (in whatever form) published externally or notified in the exercise of its functions including but not limited to any: • network and asset standards (including both technical and maintenance standards); • requirements for policies and processes in relation to AMB authorisation • asset management plans, systems and processes • configuration control processes • asset and configuration data condition requirements • asset and condition reporting requirements.	TfNSW
Asset Management Framework (AMF)	Defines how the requirements of the Transport Asset Management Policy are deployed, and enables Transport to manage the need for, and performance of, assets and asset systems over the full asset life cycle.	TfNSW
asset management system	Management system for asset management whose function is to establish the asset management policy and asset management objectives. In the TfNSW context, this is the Asset Management Framework.	ISO 55000:2014
asset reference	A brief description of an asset, used to help identify the asset and saved in the DE asset register.	-
asset register	Record of asset inventory considered worthy of separate identification including associated historical, condition, construction, technical and financial information about each asset. See also Digital Engineering (DE) asset register.	TfNSW
asset steward	The party given the responsibility by a custodian to oversee part of the life cycle process for an asset.	TfNSW
attribute	A piece of data forming a partial description of an object or entity.	PAS 1192-2:2013
Australian Height Datum (AHD)	A geodetic datum for altitude measurement in Australia.	-

Term	Definition	Reference
B		
Before You Dig Australia (BYDA)	BYDA is the established national organisation for Before You Dig members (formerly known as Dial Before You Dig) that provides the free pre-excavation referral service for the Australian community. BYDA provides a single point of contact to request information about any infrastructure networks at your planned project site without needing to contact utility organisations individually.	BYDA
BIM model	3-dimensional digital representation of grouped assets represented by geometrical information contained within a model. The BIM model also contains non-geometrical information. The BIM models are typically developed for each discipline in native format.	-
building information modelling (BIM)	Process of designing and constructing a building or infrastructure asset using object-based 3D modelling.	TfNSW
business discipline	A functional grouping that provides system-wide (not asset specific) classification of tasks, activities, deliverables or data, based on the business unit responsible. For example, sustainability, scheduling, contracts administration, etc.	-
business requirements specification (BRS)	The document in which business goals and stakeholder requirements are documented.	T MU AM 06010 GU
C		
Clash rendition / detection	Rendition of the native format model file to be used specifically for spatial coordination of discipline data (used to achieve clash avoidance or to be used for clash detection). This is the process of 'federating' discipline models for the purpose of design and construction coordination.	PAS 1192-2:2013
classification	Systematic arrangement of headings and sub-headings for aspects of construction work including the nature of assets, construction elements, systems and products. Uniclass has been adopted as the basis of TfNSW's classification system for use during the Planning and Create/Acquire phases.	PAS 1192-2:2013
common data environment (CDE)	A CDE is a collective name given to a group of integrated IT systems within an organisation that enables users to store, collaborate and exchange information and data. In accordance with the DE Framework concept of CDE, for TfNSW projects the CDE is divided into two parts: TfNSW-CDE and Contractor-CDE	TfNSW

Term	Definition	Reference
computer aided drafting (CAD)	A computer aided drafting software application with ability to design, draw and output drawings from the software.	-
configuration management framework baseline and review gate	Project milestones throughout the asset life cycle used to control and manage network configuration changes. Different submission deliverables are required for each review gate.	-
construction operations building information exchange (COBie)	Structured information for the commissioning, operation and maintenance of an asset, often in neutral spreadsheet format, that will be used to supply data to the organisation to populate decision making tools, facilities management and enterprise asset management (EAM) systems.	PAS 1192-2:2013 PAS 1192-3:2014 BS 1192-4: 2014
cost breakdown structure (CBS)	A breakdown of project expenditure that provides meaningful groupings of capital (and sometimes operational) expenditure. The CBS is often associated with the lowest level of the work breakdown structure (WBS).	-
Create/Acquire phase	Design, build, integrate and accept stage of a Transport for NSW (TfNSW) asset life cycle.	TfNSW
D		
Demand/Need phase	Stage of an asset where the strategy is in place to execute a process prior to appointing a team.	-
design and construct (D&C)	A method to deliver a project in which design and construction are contracted by a single entity.	-
design company	The party responsible for carrying out the design and drawing content on the drawing.	-
Digital Engineering (DE)	A collaborative way of working, using digital processes, to enable more productive methods of planning, designing, constructing, operating and maintaining assets.	TfNSW
Digital Engineering (DE) asset register	A record of identified asset inventory that relates an asset to the digital engineering project data building blocks concepts.	DMS-FT-537
Digital Engineering Execution Plan (DEXP)	A plan that delivers and explains how the digital information management aspects of the appointment will be carried out by the contractor over the design and construction stages of a project.	TfNSW
Digital Engineering Framework (DEF)	An integrated management system that comprises of a set of documents including standards, guidelines, templates and training that provide the strategy to support a culture that enables the implementation of Digital Engineering.	TfNSW

Term	Definition	Reference
Digital Engineering Standard (DES)	The Digital Engineering Standard is the lead document in the DE Framework, providing the minimum requirements for the adoption of Digital Engineering processes.	TfNSW
digital twin	Digital model of a real-life object, process or system. The digital model can be informed by historical data and fed with live sensor data to make the digital model a 'twin' of the real-life	DMS-ST-202
E		
engineering company	The TAO responsible for the design on the drawing.	-
enterprise asset management (EAM)	Also referred to as an enterprise asset management (EAM) system, which is a computerised system, or software that enables asset management and/or maintenance management data and activities.	TfNSW
Enterprise Content Management (ECM)	A tool (system/software) for storing, retrieving, sharing and otherwise managing electronic documents. Also referred to as enterprise document management (EDM) tool or project data and collaboration system (PDCS).	PAS 1192-2:2013 PAS 1192-3:2014
enterprise document management (EDM)	See Enterprise Content Management (ECM).	-
exchange information requirements (EIR)	Production, management and characteristic requirements for information to be submitted under a contract.	AS ISO 19650.1:2019
F		
federated model	Federation of the discipline 3D model data into a combined model for coordination including all geometrical and non-geometrical information.	-
federation	The amalgamation of discipline (task based) 3D model data.	TfNSW
G		
Geographic Information Systems (GIS)	A system to capture, store, manipulate, analyse, manage, and present all types of geographical data. GIS software can include 2D and 3D geometry data.	-
geometrical information	Information in a digital model that relates to the physical geometry only.	AS ISO 19650.1:2019
geotech	Data and practices pertaining to the engineering of soil and rock.	-
globally unique identifier (GUID)	A unique identification number automatically produced for each object within the BIM model by the authoring software.	-

Term	Definition	Reference
H		
handover DE asset register	Required information from the project to be maintained/developed during the operations and maintenance phase.	DMS-FT-537
I		
Industry Foundation Classes (IFC)	Industry Foundation Classes is a specification for open BIM to support an open standard for information exchange. Maintained by buildingSMART International.	buildingSMART International
information exchange	Structured collection of information at one of a number of predefined stages of a project with defined format and fidelity.	PAS 1192-2:2013
information management	Tasks and procedures applied to in-putting, processing and generation activities to ensure accuracy and integrity of information.	PAS 1192-2:2013
information model	A data set consisting of documentation, geometrical (graphical) and non-geometrical (non-graphical) data. Information models are linked together using a common data structure (schemas) and classification system.	PAS 1192-2:2013
inspection test plan (ITP)	Plan outlining the required inspections or tests to be carried out to control quality of the project during construction. The ITP also forms a checklist where a log of inspections and tests can be recorded.	-
J		
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K		
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L		
level of definition (LOD)	The collective term used for and including the 'level of detail' (graphical/geometrical) and 'level of information' (non-graphical/ non-geometrical). This is equivalent to the US BIM Forum (Building SMART US Chapter) <i>Level of Development</i> .	PAS 1192-2:2013
level of detail (LoD)	Level of detail is the amount of geometrical (graphical) information contained in a 3D model.	PS 1192-2:2013
level of information (LoI)	Level of information is the amount of non-geometrical (non-graphical) data embedded within an information model.	PS 1192-2:2013
location classification	Location classifications identify and group places and spaces. They are used to indicate where an asset is in relation to other assets and/or where activities take place.	-

Term	Definition	Reference
M		
maintenance managed item (MMI)	The level of the asset hierarchy at which an asset is individually maintained or at which management decisions to repair, renew or replace are made. The lowest level of the asset hierarchy where an asset is to be included in the handover DE asset register. Determined by the conditions set out in T MU AM 02001 ST – <i>Asset Information and Register Requirements</i>, Version 4.0, Section 9.4, Creation of assets in the asset register.	T MU AM 02001 ST
Master Information Delivery Plan (MIDP)	A document in which the contractor identifies all of the information deliverables that will be submitted as part of the contract scope, and provides sufficient information about each item to manage delivery effectively.	-
metadata	Information/data used for the description and management of all geometrical (graphical) and non-geometrical (non-graphical) on a project.	TfNSW
Model Production and Delivery Table (MPDT)	A schedule of elements noted in a spreadsheet format to define the level of model detail (geometrical) and the level of model information (non-geometrical) per element at any given stage of a project.	PAS 1192-2:2013
N		
non-geometrical (non-graphical) information	Information that relates to the data stored or linked to BIM models.	AS ISO 19650.1:2019
O		
Operate/Maintain phase	The phase of the life cycle of an asset during which the asset is used, operated and maintained.	TfNSW
organisational information requirements (OIR)	Data and information requirements to achieve the organisation's high level strategic objectives.	AS ISO 19650.1.2019
organisation information model (OIM)	Data and Information from across all departments of the organisation that provides an information data model as defined by the OIR. The information in the OIM is used to assess performance against the organisational objectives and inform high-level strategic decision-making.	-
P		
Planning phase	The Concept, Specify and Procurement stages of the asset life cycle. Usually occurs within a capital project.	-

Term	Definition	Reference
principal design party	An engineering organisation that is authorised to take responsibility, on behalf of TfNSW, for assuring their engineering services or products. The principal design party may also be referred to as TAO, lead designer or internal TfNSW authoriser. In the context of PAS 1192-2:2013 a TAO can be referred to as a task team author of their dedicated information.	-
professional services contractor (PSC)	Consultancy offering professional services to TfNSW.	TfNSW
project data and collaboration system (PDCS)	See Enterprise Content Management (ECM).	-
Project Data Building Blocks (PDBB)	The master data and management tool used to standardise and manage common language and coding. It is also used to generate Project Data Schemas.	-
Project Data Schema (PDS)	The configuration specification and specific project data to be adopted from the Project Data Building Blocks for a DE discipline deliverable.	-
Project Data Schemas (PDSs)	When a reference is made to more than one PDS, the abbreviation is PDSs.	-
project DEXP	The generic DEXP template updated to reflect project specific requirements, data standards and ways of working.	-
project information model (PIM)	Information model developed during the design and construction phase of a project. The PIM contains geometric and non-geometric data and can be accessed by both the Contractor and TfNSW via the CDE.	PAS 1192-2:2013 PAS 1192-3:2014
project information requirements (PIR)	Equivalent to Employer's Information Requirements, renamed for the TfNSW context. The information to be delivered and the standards and processes to be adopted by the supplier as part of the project delivery process. In a TfNSW context, project information requirements are specified in the Project Contract and the Works or Services Brief.	PAS 1192-2:2013 TfNSW
public private partnership (PPP)	A PPP allows governments and the private sector to work together and share resources. A PPP is generally considered for projects with a capital cost of more than \$50 million.	National PPP Policy Framework
published	Component of the common data environment (CDE) used for information that has been authorised for use.	AS ISO 19650.1:2019
Q		
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Term	Definition	Reference
R		
Renew/Dispose phase	The last phase in the asset life cycle. The end of life of a given asset.	TfNSW
request for information (RFI)	Formal project specific process, whereby the Contractor may request specific information from TfNSW. The project-specific process should be documented in the DEXP.	-
S		
Safety, Environment and Regulation (SER)	Business unit of Transport for NSW. The Asset Management Branch (AMB) is part of SER.	TfNSW
safe work method statement (SWMS)	Health and safety risk assessment.	-
schema	The specific metadata fields and values to be complied with during the creation of DE project data.	-
service provider	An organisation outside of TfNSW offering and delivering a service.	TfNSW
shared	The shared area of the CDE is where the information is approved for sharing between Contractor and TfNSW.	AS ISO 19650.1:2019
specification	The specific fields and configuration, including data formats, masks and business rules that are to be complied with during the creation of DE project data.	-
submission	A set or package of deliverables, of varying detail, required at each of the configuration management gates.	-
system requirements specification (SRS)	An SRS document lists all of the requirements at the system level that describe the functions which the system as a whole should fulfil to satisfy the stakeholder needs and requirements (BRS). It is expressed in an appropriate combination of textual statements, views and non-functional requirements; the latter expressing the levels of safety, security and reliability that will be necessary.	T MU AM 06010 GU
T		
technical discipline	A functional grouping that provides asset specific classification of tasks, activities, deliverables or data, based on the engineering unit responsible. For example, civil or electrical technical disciplines.	-

Term	Definition	Reference
Technically Assured Organisation (TAO)	An engineering organisation, typically for rail projects, that is authorised to take responsibility, on behalf of TfNSW, for assuring their engineering services or products. For non-rail projects, the use of 'TAO' is synonymous with Principal Design Party, lead designer or internal TfNSW authoriser.	TfNSW
Transport agency	Transport agencies who work across the Transport cluster which include: • State Transit Authority • NSW TrainLink • Sydney Trains • Sydney Metro	TfNSW
Transport cluster	The Transport cluster is made up of an extended network of government agencies and private organisations which work together to deliver transport services.	TfNSW
Transport for New South Wales (TfNSW)	Organisation who leads the development of safe, integrated and efficient transport systems for the people of NSW. TfNSW customers are at the centre of all activities, including transport planning, strategy, policy, procurement and other non-service delivery functions across all modes of transport – roads, rail, ferries, light rail and point to point.	TfNSW
U		
Uniclass	A unified classification system covering all construction sectors and items for the construction industry.	NBS
V		
Visualisation	Use of computer graphics and image processing to present models or characteristics of processes or objects.	ISO/IEC AWI 30173
W		
work breakdown structure (WBS)	The WBS decomposes or subdivides the scope into more discreet and manageable, deliverable-based packages of works. This provides the framework from which the project management and project control systems will be set up to facilitate the tracking and reporting of the project status and cost (CBS). The primary method used for grouping, sorting and organising project scope.	-
work in progress (WIP)	The WIP area of the CDE is used for information that is being developed by the project team.	AS ISO 19650.1:2019
work packages	Standard grouping mechanism to group design, supply, construction or commissioning activities into logical scope packages.	-

Term	Definition	Reference
work zone	Manageable spatial subdivision of a project, defined by the project team as a subdivision of the overall project, that allows more than one person to work on the project model simultaneously. It is consistent with the analysis and design process.	-
X		
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Y		
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Z		
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Document history

Version	Published date	Summary of changes
1.0	September 2018	Interim Approach Issue
1.1	-	Minor updates
2.0	April 2019	Project Data Building Blocks, minor updates
3.0	October 2019	Minor updates
4.0	November 2020	Updated for road assets
4.1	April 2021	Minor updates. Alignment with Release 4.0 DE Standards
4.2	December 2022	Minor updates. Alignment with Release 4.1 DE Standards

